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The persisting gap between HIV/AIDS knowledge and risk prevention among Kenyan youth

1. INTRODUCTION

Kenya is one of the countries in sub-Saharan Africa most devastated by the AIDS pandemic. According to UNAIDS estimates for 2002, HIV prevalence was 15% among Kenyan adults (UNAIDS/WHO, 2002). As a result of the new information from the 2003 Kenya Demographic Survey (CBS, MOH and ORC Macro, 2004), which included HIV testing, Kenya's HIV prevalence estimates have been recently revised downward to 7%[1]. This means that there are approximately 1.1 million adults infected with HIV, and about two-thirds of those infected are women (UNAIDS, 2004). Additionally, more than 100,000 children under the age of five are estimated to be seropositive (Ministry of Health, 2002), and many of them have lost or will lose their parents to AIDS (Ayieko, 1998; Bicego *et al*., 2003). Life expectancy is projected to decline to 45 years by 2010-2015, whereas it would have been expected to rise to 65.3 years in the absence of AIDS (United Nations, 2003a), and AIDS-orphans are projected to reach 1.5 million by 2005 (NACC, 2001).

The Kenyan government's response to the AIDS epidemic has shifted from its earlier denial to public acknowledgement of the epidemic as a major public health threat, requiring clear policy guidelines and effective organizational structures. The HIV/AIDS Strategic Plan and policies are currently integrated into the agenda of the entire government of Kenya. However, it took 15 years – from 1984 when the first case was reported to 1999 when the President declared AIDS a national disaster – to fully acknowledge the epidemic not only as a public health emergency, but also as a multifaceted crisis that reaches deep into the society and its ability to develop. The HIV/AIDS epidemic has erased decades of progress in combating mortality and is seriously compromising the living conditions of current and future generations (United Nations, 2003b).

[1] The measurement of HIV prevalence in the 2003 Kenya Demographic Survey has proven useful in calibrating HIV prevalence estimates of the general population from sentinel surveillance in pregnant women and has resulted in downward projections of the severity of the epidemic. Acknowledgement of the high ratio of 1.9 women infected for every man is one of the main factors underlying these adjustments (CBS, MOH and ORC Macro, 2004)

The fight against AIDS has relied heavily on educational programs and on mass media to disseminate information and reduce misinformation. Initial public AIDS awareness campaigns relied upon the assumption that correct information on transmission and prevention of HIV infection would lead to behavioral change (Ministry of Health, 1997). Some major achievements have been accomplished, because nowadays awareness of the lethality of AIDS is practically universal, and levels of correct knowledge regarding the transmission and prevention of HIV increased considerably in the country during the 1990s (NACC, 2003). However, widespread awareness about AIDS has not been accompanied by a significant decline in potentially risky sexual behaviors, particularly among adolescents and young adults (Bauni and Jarabi, 2000; Nzioka, 2001). Several studies have documented similar difficulties in bridging the gap between AIDS awareness and preventive behavior in other countries (Caldwell *et al*., 1999; Hulton *et al*., 2000; Rwenge, 2000; United Nations, 2002; Anarfi, 2003; Meekers *et al*., 2003).

One of the most widely used theoretical models of health behavior change is the Health Belief Model (Janz and Becker, 1984). Conceived as a framework for understanding how individuals assess and interpret information on health threats and move to preventive action, it has been widely applied in the context of HIV (Brown *et al*., 1991; Rosenstock *et al*., 1994; Volk and Koopman, 2001). According to this model, health protective behaviors, including safe sex practices, result from a decision-making process through which individuals evaluate the severity of the infection, the degree to which they believe themselves susceptible to it, and the benefits and barriers they expect from adopting preventive behaviors. This model, however, fails to take into account structural and cultural factors (Parker, 2001), as well as the role of partners, family and the community in shaping people's perceptions, choices and decisions (UNAIDS, 1999). For example, cultural norms on sexuality and socially constructed gender roles reinforcing male control over sexual decision-making may limit women's ability to change their behavior, even when they perceive themselves at risk of HIV infection (Gage, 1998).

Despite its limitations, the Health Belief Model introduces a useful concept, perceived susceptibility, which can provide useful insights into the gap between HIV/AIDS awareness and adoption of safe sex practices. While knowledge about HIV may be adequate, people usually do not feel motivated to modify their behavior unless they sense they are personally at risk of infection. The central role of perceived susceptibility in behavioral change has been highlighted in recent research (Sheppard *et al*., 2001; Bernani, 2002; deGraft-Johnson *et al*., 2004; Macintyre *et al*., 2004). Of special interest is the study by Akwara *et al*. (2003), which documents the

strong association between perceived risk of HIV infection and risky sexual behavior for Kenyan women and men of reproductive age.

Our study examines the linkages between AIDS-related knowledge, perceived personal risk and adoption of safe sex practices among Kenyan youth. The study focuses on young people for various reasons. Young cohorts comprise a large percentage of the Kenyan population (approximately 30%) and HIV prevalence is relatively high particularly among young women – 6% of women compared to 1% of men aged 15-24 (CBS, MOH and ORC Macro, 2004). Therefore, the future course of the epidemic will largely depend on the success of prevention strategies adopted by this group (Zabin and Kiragu, 1998; UNICEF/UNAIDS/WHO, 2002). Furthermore, establishing safe sexual behavior from puberty becomes the most effective long-term weapon against the continued spread of HIV (NACC, 2003). Since childbearing starts at a young age in Kenya, and young women are particularly prone to infection (Glynn *et al*., 2001; Gregson and Garnett, 2002), averting HIV infection in this group would significantly reduce mother-to-child HIV transmission. Young adults also make important contributions to their households, and their increased morbidity and mortality impoverishes their families and communities (United Nations, 2003b). Intergenerational support systems are negatively affected as well. The elderly, who in the past relied on younger family member for social and economic support, are increasingly assuming the burden of caring for their sick children and fostering grandchildren whose parents are deceased or too sick to take care of them (Nyambedha *et al*., 2003).

We first describe the changing context of transition to adulthood in Kenya and then we examine whether knowledge of AIDS transmission and prevention influences the likelihood of engaging in potentially risky sexual behaviors. The relationship between actual risk and perceived risk is discussed next. The final part of the analysis reviews behavioral change in response to AIDS and assesses the intervening role of perceived susceptibility on behavior change. Given the prevailing gender differentials in risk taking, perceived risk and preventive behavior (Meekers and Calves, 1999; Sheppard *et al*., 2001), data for young women and men are analyzed separately for comparative purposes.

2. DATA AND METHODS

The Demographic and Health Surveys (DHS) program has been producing cross-national and comparative quantitative data on population, health, and nutrition throughout the developing world since 1985, financed

by the United States Agency for International Development and with technical assistance from the research firm ORC Macro. Over the last 20 years, the DHS project has coordinated close to 200 surveys in more than 70 countries throughout Sub-Saharan and North Africa, Asia, Latin America, the Caribbean, and parts of Europe. Through household, women's and men's questionnaires, these large, nationally representative surveys cover a wide range of topics, including sexual and reproductive health (Vaessen *et al*., forthcoming).

The description of the changing context of transition to adulthood in Kenya is based on the analysis of four nationally representative surveys: the 1977/78 Kenyan World Fertility Survey and the 1989, 1993 and 1998 Kenyan Demographic and Health Surveys. These surveys cover a 20 year period, allowing us to examine how sexual, marital and contraceptive patterns among youth have changed from a period when AIDS was unknown to a period when it became a major public health concern. The analysis of risky sexual practices, risk perception and preventive behavior is based on the 1998 Kenya Demographic and Health Survey (KDHS). The 1998 KDHS (NCPD, CBS and MI, 1999) included an AIDS module with detailed information on knowledge and attitudes on AIDS, sexual practices, perception of personal risk and behavioral change in response to the threat of HIV infection.

Despite initial concerns that information on sexual behavior might be difficult to collect and prone to misreporting because of its highly sensitive nature, recent survey experiences suggest that with proper questionnaire design, interviewer training and confidentiality assurance, refusal rates are low. Furthermore, most data assessments are optimistic about the quality and reliability of the information collected (Dare and Cleland, 1994; Gage, 1995; Curtis and Sutherland, 2004).

The analysis focuses on three outcome variables: risk-taking behavior, perception of risk and behavioral change in response to AIDS. Since all of them have been coded as dichotomous variables, logistic regression models are used in all multivariate analyses. The results are expressed as odds ratios, which are the exponential value of the logit coefficients and are to be interpreted relative to the reference category. The sample used in the study is restricted to sexually experienced women and men aged 15 to 24 (2,155 females and 1,015 males). The sample includes both married and unmarried respondents because, given the relatively large proportion of married men who report multiple partners, it is not realistic to assume that exposure to the risk of AIDS is confined to unmarried youth.

The socio-demographic characteristics of the sample are shown in Table 1. All these socio-demographic variables are included in the multivariate

models, as potential confounding factors, but we focus primarily on the impact of several indicators of exposure to risk (*i.e.*, age at first sexual intercourse, number of sexual partners, whether last partnership was casual[2], whether respondent received/gave money for sex, and experience of *STI*s), three indicators representing various facets of knowledge about HIV/AIDS (*i.e.*, knowing that a healthy-looking person can have AIDS, that HIV can be transmitted through sexual intercourse, and that condoms can prevent infection), and measures of perceived AIDS severity (*i.e.*, whether AIDS is considered a lethal or curable disease), perceived AIDS prevalence (*i.e.*, acquaintance of someone who has AIDS or has died of AIDS) and perceived personal risk of infection (*i.e.*, respondents' evaluation of their chances of getting AIDS as small, moderate, great or no risk at all).

3. RESULTS

3.1 The changing context of transition to adulthood

This section describes trends of sexual initiation, premarital sexual activity and contraceptive use among Kenyan youth. Table 2 shows that a large proportion of Kenyan women and men start sexual activity in their teens. In 1998, 54% of Kenyan men and 44% of women aged 15-19, and approximately 90% of all men and women aged 20-24 were sexually experienced. The data also reveal that sexual initiation occurs earlier for men than for women. The percentage of adolescent women who were sexually experienced declined slightly between 1993 and 1998. If this recent trend is genuine, it could suggest that AIDS messages encouraging young people to delay sexual initiation as a strategy against HIV infection may be having some impact. Indeed, in the 1998 KDHS, a significant proportion of young people reported that they had decided to postpone first sexual intercourse in order to reduce their chances of contracting HIV (28% of women and 21% of men aged 15-24).

The data confirm previous studies documenting that sexual activity is not confined to marriage in Kenya (Gage and Meekers, 1993; Meekers, 1994; Njogu and Castro Martín, 1998). According to the 1998 KDHS, 54% of never married men and 32% of never married women aged 15 to 19 had engaged in sexual intercourse by the time of the interview. In the 20-24 age group, 88% of never married men and 68% of never married women were

[2] Last partnership was defined as casual when the last reported sexual partner was not the respondent's spouse or regular partner, but an acquaintance or somebody else.

Table 1 – *Socio-demographic characteristics and AIDS-related knowledge for sexually experienced women and men aged 15-24*

	Women (%)	Men (%)
Socio-demographic characteristics		
Age		
15-19	37.0	45.1
20-24	63.0	54.9
Marital status		
Never/formerly in union	43.5	89.6
Currently in union	56.5	10.4
Number of children		
0	36.3	88.3
1+	63.7	11.7
Educational level		
None	4.6	1.5
Primary incomplete	41.8	35.1
Primary complete	26.0	23.9
Secondary +	27.6	39.4
Enrolment status		
In school	10.6	25.9
Residence		
Rural	72.4	75.2
Urban	27.6	24.8
Religion		
Catholic	28.4	29.1
Protestant	64.3	60.4
Muslim/Other	7.3	10.5
AIDS-related knowledge		
Ever heard of AIDS	99.3	99.8
Thinks AIDS is fatal almost always	86.7	77.8
Knows a healthy-looking person can have AIDS	77.6	85.4
Knows a person can get AIDS from sexual intercourse	68.6	84.7
Knows condoms can prevent AIDS	45.3	66.1
Knows a person with AIDS	68.5	64.3
Tested for HIV	19.4	14.6
	(N=2155)	**(N=1015)**

TABLE 2

sexually experienced. The high prevalence of premarital sexual activity has been linked to the fact that age at first marriage has increased considerably over time while age at first sex has remained relatively stable (Njogu and Castro Martín, 1998). In 1977, 27% of Kenyan women 15 to 19 years old were married, but this figure declined to 17% in 1998.

Condoms, used properly and consistently, are one of the leading methods of protection against HIV infection (Hearst and Chen, 2004). However, the prevalence of condom use in Kenya, as in most sub-Saharan African countries (Amouzou, 2003), is very low, particularly in stable unions (Pullum *et al*., 2003). Until recently, family planning programs focused on reducing unwanted fertility rather than on preventing sexually transmitted infections (*STI*s) and HIV/AIDS. Consequently, contraceptive use has increased considerably in the country (Magadi and Curtis, 2003; Kimani and K'Oyugi, 2004), but the methods adopted do not protect women and men against AIDS. The proportion of women aged 20-24 using modern contraception increased from 12% in 1989 to 20% in 1998. However, condom use remains very low: in 1998, only 3% of sexually experienced women aged 15-24 reported using condoms. The unplanned nature of many sexual encounters among young people hinders consistent condom use. In 1998, 22% of young women and 65% of young men reported having ever used a condom, but only 3% of women and 33% of men report condoms as their current contraceptive method. The divergence between ever and current condom use suggests that use is inconsistent and that it probably varies with type of partner (Adetunji, 2000). Among married women, low condom use is possibly linked to its interference with childbearing plans and the difficulties women experience negotiating condom use with their spouses. Men, on the other hand, may use condoms occasionally, particularly in casual and extramarital sexual relationships, but less frequently with their spouses. Lack of access to reproductive health services is another important barrier to condom use: in the 1998 KDHS, 43% of sexually experienced young women and 17% of young men reported that they did not know where to get condoms.

3.2 The discrepancy between AIDS-related knowledge and risk taking behavior

The 1998 KDHS shows that virtually all Kenyan young women and men have heard of HIV/AIDS, and that a large proportion knows how it is transmitted (Table 1). Nearly 85% of young men and 69% of young women identified sexual intercourse as a means of HIV transmission, and over four-fifths of young women and men were aware that HIV can be transmitted

from mother to child. However, knowledge about the methods to prevent HIV infection is not as widespread as knowledge about HIV transmission: 66% of young men and 45% of young women knew that condoms provide protection against HIV/AIDS. Although these data are possibly under-estimated because they were collected without prompting, they reveal important deficits in the level of knowledge about methods to prevent HIV infection.

Kenyan youth are also aware about the serious consequences of AIDS. Most young women and men realize that infection with HIV is ultimately fatal. It can be noted that women have a better understanding of the survival prospects for people with HIV/AIDS than men, possibly because they provide care to HIV infected persons. However, a worrisome finding is that a substantial percentage of young women (22%) are not aware that a healthy-looking person can be HIV positive.

Although some deficits remain, the widespread awareness about HIV/AIDS across all age, educational and socio-economic groups (NCPD, CBS and MI, 1999) suggests that the information and educational campaigns launched in Kenya after the seriousness of the AIDS epidemic was officially acknowledged have been relatively successful. It is also plausible that the rise of mortality and the increasing willingness of people to disclose that a relative or a friend is HIV positive or has died of AIDS have raised AIDS awareness in the country. The percentage of young adults who report knowing a person with AIDS has increased over time. In 1993, 40% of women aged 15-24 knew someone who was living or had died from AIDS, but this figure increased to 66% in 1998. The high degree of awareness is also reflected in the significant proportion of young people who have been voluntarily tested for HIV (19% of young women and 15% of young men)[3]. The percentage of young people tested for HIV will probably increase in the future. The 1998 KDHS shows that more than two-thirds of those who had not been tested for HIV declared that they would like to be tested.

Despite the relatively high levels of knowledge about the severity of AIDS and its transmission modes, many young Kenyans continue to engage in behaviors that put them at risk of HIV infection. We have defined as potentially risky sexual behaviors the following practices[4]: early onset of

[3] A multivariate analysis (not shown) revealed that secondary education, urban residence, having at least one child, and knowing a person with AIDS were the main factors significantly associated with having been tested for HIV.

[4] Our assessment of unsafe sexual practices is limited by the unavailability of data on a number of relevant risk factors, such as the number and type of lifetime partners, consistency of condom use with each partner and, most importantly, past and current risk factors of respondent's sexual partner.

sexual activity (before age 15), multiple sexual partners in the past 12 months, last sexual relationship with a non-regular partner, exchange of money or gifts for sex in the past 12 months[5], and non-use of condoms. Table 3 shows the percentage of sexually experienced women and men under age 25 who report having engaged in those sexual practices. The data reveal that, except for failure to use condoms, men are more likely than women to engage in risky sexual behaviors. Nearly half of the young men began sexual activity before their 15th birthday, and over two-fifths of those sexually experienced reported multiple sexual partners in the past year and a casual partner in their last sexual relationship. The proportion of young men who report exchanging money or gifts for sex (in the past 12 months) is also relatively high: 17%. Women are less likely than men to report having multiple partners, engaging in casual sexual relationships, or exchanging money/gifts for sex, but a very large proportion (78%) has never used a condom[6].

Table 3 – *Percentage of sexually experienced women and men aged 15-24 reporting risk sexual behaviours*

	Women (%)	Men (%)
Had first intercourse before age 15	25.1	46.6
Had more than 1 sexual partner (last 12 months)	7.9	43.4
Last sexual relationship was casual	11.6	42.9
Received/gave money for sex (last 12 months)	10.9	17.4
Never used a condom	78.4	34.6
Did not use a condom at last sex	92.4	62.8

We employed a multivariate framework to assess whether AIDS-related knowledge influences the probability that people will engage in behaviors that put them at risk of HIV infection and the results are shown in Table 4. Sexual initiation is earlier among younger cohorts, but age does not have a significant effect on the rest of unsafe sexual practices among women. The effect of marital status is in the expected direction: married women are less likely than unmarried women to report having multiple sexual partners,

[5] The exchange of money/gifts/favours for sex includes relationships with "sugar-daddies" (Luke, 2002).

[6] The large discrepancy between men and women in reported condom use could be due to underreporting of condom use by women and also to the differential marital composition of young men and women. Whereas most men aged 15-24 are unmarried, a large proportion of women in this age group are married, and condom use is documented to be higher among unmarried than married persons.

casual sexual relationships or exchanging money/gifts for sex, but they are less likely to have ever used condoms. Having at least one child reduces the chances that a woman will have casual sexual relationships, but does not significantly affect the other measures of risky sexual behavior. Education considerably reduces the likelihood of engaging in all risky sexual behaviors. However, although women who are currently enrolled in school are less likely to have had multiple sexual partners, they are more likely to have experienced casual sex than those who are not enrolled in school. Women residing in urban areas are more likely to have exchanged money/gifts for sex, but are also more likely to have used condoms than their rural counterparts. An important finding is that the early onset of sexual activity increases the probability of subsequently engaging in risky behavior. With regard to the impact of AIDS-related knowledge, we find no consistent effect across all risk behaviors examined. On one hand, young women who know that AIDS can be transmitted through sexual intercourse and that condoms can protect against HIV/AIDS are more likely to use condoms. But on the other hand, awareness that a person can get AIDS from sexual intercourse is associated with having multiple sexual partners.

The results for young men show some patterns that are similar to those for women: lower likelihood of engaging in risky sexual behaviors among those in marital union (except for failure to use condoms), a strong and consistent effect of education in reducing risky behaviours (except that those still enrolled in school are less likely to have ever used condoms), and a significant effect of early age at first sex on subsequent engagement in risky sexual practices, such as having multiple sexual partners and exchanging money/gifts for sex. Similar to the results for women, we find no evidence that enhanced knowledge about AIDS reduces consistently all risk behaviors examined.

3.3 The (mis)match between perceived and actual risk

One possible explanation for the lack of solid evidence on the apparently logical link between AIDS-related knowledge and reduced risk behavior is that individuals often think of the possibility of infection as a distant threat (Venier *et al*., 1998). This is particularly the case during adolescence, when inexperience and psychological developmental factors promote a certain sense of invulnerability (Bankole *et al*., 2004). Since individuals are unlikely to adopt "safe" sexual behavior unless they believe that they are susceptible to infection, it is important to understand how they evaluate their personal risk. In this section, we first describe how young people assess their own risk, then examine the discrepancies between

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perceived and actual risks, and finally evaluate the association between risky sexual practices and self-assessed risk in a multivariate framework.

Table 5, panel a, presents the distribution of sexually experienced young women and men according to their perceived chances of contracting AIDS. The proportion that perceives their risk of infection as moderate or great is higher among young women (33.2%) than among young men (25.2%), despite the fact that young women are considerably less likely to engage in high-risk sexual behaviors. This discrepancy is linked to the large proportion of women who perceive their risk to be high not because of their own behavior but their partners' (Table 5, panel b). According to the survey data, 64% of the women who think their chances of infection are moderate or great reported their spouse/partner's infidelity as the main reason – the corresponding proportion among men was only 5%. This finding is consistent with previous studies (Sheppard *et al*. 2001; Akwara *et al*., 2003) and has important consequences for behavioral change in response to the threat of AIDS. Acknowledgement of personal risk is generally the first step towards adopting preventive behavior. However, many Kenyan women may feel that changing their partner's sexual habits is beyond their control, and that negotiating protective measures, such as condom use, is not acceptable because of established gender norms (Gage and Njogu, 1994).

The discrepancy between perceived and actual risk among young people might be large because perceived risk is to some extent socially constructed – reflecting, for example, age-graded norms of sexual behavior and AIDS prevalence in the community – and may not accurately reflect the actual likelihood of becoming seropositive. Table 5, panel c, presents the proportion of young women and men who perceive themselves at small or no risk of contracting AIDS, even though they report having engaged in risky sexual behaviors[7]. The data reveal that actual risks are not perceived as such by a large part of the young population. The proportion of young adults who initiated sexual activity at an early age, who had multiple or casual sexual partners, who exchanged gifts or money in return for sex or who never used a condom – behaviors that entail an objective risk, given the relatively high prevalence of HIV in the country – but perceive themselves at no risk is remarkably high: in the range of one-half to three-fourths. Among all the risk factors examined, women who have experienced a STI show the smallest discrepancy between perceived and actual risk, yet two-fifths of

[7] Besides the risky sexual behaviours examined in Table 4, we have also included having reported a *STI* in the past 12 months because *STI*s are important cofactors of HIV transmission (Cohen, 1998), and having had more than 5 partners in the past 12 months, information that is only available for men.

Table 5 – *Perception of risk among sexually experienced women and men aged 15-24*

	Women (%)	Men (%)
a) Perceived chances of getting AIDS		
No risk at all	31.8	27.6
Small	35.0	47.2
Moderate	23.0	19.9
Great	10.2	5.3
b) Main reasons among those reporting moderate or great chances of getting AIDS		
No condom use	21.3	32.4
More than one sex partner	15.5	15.8
Partner not faithful	63.7	(4.8)
Sex with prostitutes	-	(3.5)
c) Percentage of respondents reporting high risk sexual behaviors who perceive themselves at small or no risk of HIV infection		
Had first intercourse before age 15	67.2	70.8
Had more than 1 sexual partner (last 12 months)	56.3	63.5
Last sexual relation was casual	67.9	70.0
Received/gave money for sex (last 12 months)	60.3	62.4
Never used a condom	68.9	75.0
Had *STI* in last 12 months	41.5	51.7
Had more than 5 partners in last 12 months	-	56.3
N	**2,155**	**1,015**

Note: Percentages based on less than 50 cases are in parentheses.

them assess their risk as low. These data confirm that, despite widespread knowledge about AIDS, personal risk tends to be underestimated.

The multivariate model in Table 6 examines the association between actual exposure to risk and self-perceived risk, controlling for AIDS-related knowledge. The dependent variable, labelled as "high perceived personal risk", includes both *great* and *moderate* self-assessed chances of contracting AIDS (versus *low* or *no* chance). The covariates include respondents' background characteristics, reported sexual behaviors that objectively increase exposure to infection, AIDS-related knowledge and personal acquaintance with a person with AIDS. Acquaintance with someone who has died or is living with AIDS is a proxy for the levels of AIDS morbidity and mortality in the community, which is hypothesized to shift the perception of AIDS from a distant to an immediate threat (Macintyre *et al*., 2001). An important limitation of this analysis is the lack of data on partner's risky

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sexual behavior, which is a crucial determinant of perception of risk, especially among women.

The results show that socio-demographic characteristics do not significantly affect a respondent's self-perception of risk, once knowledge about AIDS and patterns of sexual behavior are held constant. The fact that marital status does not affect perception of risk is somewhat surprising, particularly for women, given their lower likelihood of engaging in risky sexual behaviors after marriage. However, we have already noted that a large proportion of married women mention their partners' infidelity as the reason why they perceive their risk of contracting HIV to be high. The association between actual and perceived risk is statistically significant for some sexual behaviors, but not for others. For instance, early onset of sexual activity and non-use of condoms do not significantly affect the perception of personal risk among young women and men. Similarly, having engaged in casual sex does not increase the level of self-assessed risk among women, although it does among men. The remaining coefficients are in the expected direction: respondents reporting multiple sexual partners, exchange of money/gifts for sex or a recent *STI* experience are more likely to define their own risk of contracting AIDS as high. Having accurate knowledge about AIDS is a precondition for evaluating adequately one's risk and the results show that most of the AIDS-related knowledge variables are associated with high perceived risk, although not all items are consistently significant for women and men. Knowing someone with AIDS also increases the perception of personal risk, presumably because it removes the illusion of safety within one's social circle, although it is only statistically significant for men.

3.4 Behavioral change in response to AIDS

Individuals with similar levels of knowledge about AIDS may respond differently to the epidemic. Some persons who engage in risky sexual practices may underestimate their personal susceptibility to infection and feel no need to modify their behavior. Others, although considering their personal risk as high, may have fatalistic attitudes towards AIDS and rely on chance rather than taking preventive action to avoid contagion. Nevertheless, according to most theoretical frameworks, the adoption of preventive behavior is more likely to occur among those who feel susceptible to infection (Gregson *et al*., 1998). This section examines the association between perceived risk and behavior modification in response to AIDS among young people in Kenya.

Table 7 presents the main changes of behavior that respondents report to have taken since they heard of HIV/AIDS. As found in previous studies

(Sheppard *et al*., 2001; United Nations, 2002), women are less likely to report behavioral change despite the fact that they are more likely than men to assess their personal risk as high. The preventive strategies adopted also differ considerably by gender. Among women, the most frequent behavioral response to AIDS is fidelity: 57.7% maintained only one sexual partner and 14.8% asked their partner to be faithful. Only a small proportion of women (4.0%) stated that they had started to use condoms to prevent infection. Among young men, behavioral responses to the AIDS threat are more diversified. Monogamy is still the most common response: 42.1% maintained only one sexual partner and 3.9% asked their partner to be faithful. However, in contrast to women, a significant proportion of young men reported that they had begun to use condoms since they heard of AIDS (36.2%).

Table 7 – *Reported change of behaviour because of AIDS*

	Women %	Men %
Stopped sex	8.1	11.5
Started using condoms	4.0	36.2
Only one sexual partner	57.7	42.1
Reduced partners	9.3	24.6
Asked spouse to be faithful	14.8	3.9
Avoided sex with prostitutes	-	4.7
No change	*18.0*	*5.9*
	(N=2142)	**(N=1015)**

If we take survey responses at face value, a large majority of young Kenyans have taken some action to protect themselves from HIV infection: 82% of the women and 94.1% of the men. These proportions are obviously very high and could be partly due to respondents' reluctance to admit a passive attitude towards AIDS or to a tendency to report behaviors that have been taken for other reasons (such as monogamy) as actions taken to prevent HIV infection. Responses may also reflect intentions rather than actual and sustained behavioral change. Indeed, when reported behavioral change is contrasted with related answers in the questionnaire, large inconsistencies are found. For instance, among men who reported monogamy as their main response to AIDS, 26.3% had multiple partners in the past 12 months; and among those who reported avoiding prostitutes, 28.3% exchanged money/gifts for sex in the past 12 months. Some of these inconsistencies could be partly attributed to the different time frame each question refers to: individuals may have engaged in risky sexual practices during the recent past but modified that behavior prior to the interview. However, it is quite likely

that reported behavioral change has been overstated to conform to socially desirable norms.

Because of the biases suspected in self-reported behavioral change, the analysis in this section is restricted to condom use as the main action taken to prevent HIV infection. An important limitation of this analysis is that only a small proportion of women adopted condom use as a preventive strategy against AIDS. Therefore, because of the relatively small number of cases, the results for women should be taken with caution. Table 8 presents the results of the multivariate logit model. The covariates include background characteristics, exposure to risk, AIDS-related knowledge, respondents' appraisal of the survival chances for HIV positive persons –an indicator of perceived severity, acquaintance of somebody with AIDS, and self-assessed degree of risk, the factor hypothesized to mediate between risk exposure and risk prevention. We have also included an indicator of whether the respondent has been tested for HIV, an experience that could act as a catalyst for behavioral change, regardless of the test outcome (Sweat *et al*., 2000).

The results in Table 8 suggest that education plays a major role in adopting condom use for AIDS prevention, and that unmarried respondents are more likely to rely on condoms than those who are married. The results also show that young persons who have engaged in some types of risky sexual practices are more likely to adopt condom use, although this linkage cannot be generalized to all practices. Having multiple sexual partners, for example, increases the likelihood of reporting condom use among men and women, but exchanging money or gifts for sex is statistically significant for men but not for women. Women who have experienced their first sexual intercourse before age 15 and those who have had a *STI* are significantly more likely to adopt condom use than those who have not. Other potentially risky behaviors, such as casual sexual relationships, do not appear to have a significant influence on condom use. Awareness of the asymptomatic incubation period of AIDS (among men) and awareness of condoms as effective preventive tools increase the likelihood of initiating condom use in response to the threat of HIV/AIDS. The strong association found suggests that increased emphasis on the effectiveness of condoms to prevent HIV transmission may increase their use for this purpose. Knowing a person who has died or is HIV positive does not appear related to initiation of condom use, but perceived severity of AIDS is significantly associated with condom use among men.

The impact of self-assessed risk on initiating condom use is significant among young men: the likelihood of reporting condom use as a response to AIDS is 67% higher among those who assess their chances of getting AIDS as high than among those who believe that they are not personally at risk.

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However, the association between perceived susceptibility to HIV infection and initiation of condom use is not significant among young women. Women must secure the cooperation of their male partners to protect themselves from infection, but issues of power and control over sexual and reproductive decisions may hinder communication and effective negotiation. It has to be noted that although the coefficients for perceived risk are statistically significant for men, the likelihood of initiating condom use does not rise monotonically with increasing perceived personal risk. This result may be related to reverse causation, *i.e.* those who have adopted condom use as a preventive strategy may feel that their personal risk has been reduced. Finally, having been tested for HIV appears positively associated with reporting condom use as behavioral change, but the coefficients are not statistically significant.

4. DISCUSSION AND POLICY IMPLICATIONS

The foundations for sexuality, reproductive health and gender relations are laid very early in life, and they largely shape the transition from adolescence to adulthood (Caldwell *et al*., 1998). In the era of AIDS, adolescents are faced with new challenges and risks. It is important not only to enhance their general awareness of risks but also to persuade them to transfer this knowledge into their personal experience.

The analysis of the changing context of transition to adulthood in Kenya revealed a trend towards later marriage but only a slight change in the timing of sexual initiation, expanding the window of exposure to potential sexual health risks. However, the prevailing assumption that risk is confined to the period before marriage might be largely deceiving. Nearly one-fourth of married men in their early 20s report extramarital sex and nearly one-fifth report exchanging gifts/favors for sex. The study showed an increase of contraceptive use among sexually active youth, but condom use is still low and inconsistent, particularly among young women. Observed patterns of contraceptive method choice suggest that unwanted pregnancy might be considered a more immediate risk than HIV infection among unmarried women, and that the need for dual protection is rarely taken into consideration in contraceptive decision-making. Low condom use among married women is possibly linked to their childbearing plans and to the difficulties faced in negotiating condom use with their spouses.

The study confirmed a pronounced gap between AIDS awareness and safe sexual behavior. Many young men and women are knowledgeable about the ways HIV is transmitted and most of them identify AIDS as a lethal

disease. Moreover, their personal acquaintance of somebody with AIDS has grown considerably since the last survey, and nearly one-fourth of respondents in their early 20s have been tested for HIV. Knowledge of HIV prevention methods is also relatively widespread, although respondents place more emphasis on limiting the number of sexual partners than on condom use. The study also documented the persistence of an important gender gap in knowledge about AIDS: young women were less likely than young men to know that a healthy looking person can be HIV positive, that sexual intercourse can transmit AIDS, and that condoms can protect them against infection.

Despite relatively widespread AIDS awareness, the proportion of adolescents and young adults that engage in risky sexual practices, such as having multiple sexual partners, casual sex, exchanging money/gifts for sex and non-use of condoms, remains relatively high. A certain amount of risk-taking is expected during adolescence before the maturity and stability that characterizes adulthood is achieved. Having several short-term relationships, for instance, might be unavoidable until a stable relationship is established. Some of these behaviors could in fact entail minor risks in low HIV prevalence communities, but not in a high HIV prevalence country like Kenya.

The results of the analysis showed that educational attainment is negatively associated with risk taking behavior but that specific knowledge about AIDS transmission and prevention does not deter risky sexual practices. This finding confirms the results of previous studies (Cleland, 1995; Dodoo and Ampofo, 2001): knowledge is a necessary but insufficient condition to reduce exposure to the risk of HIV infection.

One of the reasons why AIDS-related knowledge does not translate into safe sexual behavior might lie in distorted perceptions of risk. Our analysis showed an imperfect correspondence between actual and self-perceived risks. Although many adolescents are knowledgeable about AIDS and engage in sexual behaviors that increase their chances of infection, they fail to acknowledge that they are putting their lives at risk. Over half of the individuals who engaged in risky sexual practices considered themselves at low or no risk of HIV infection. The multivariate analysis revealed a positive association between risk behavior and risk perception, but this relationship was not consistent across all behaviors. Therefore, sensitization and educational campaigns should focus on helping young people to evaluate realistically their personal risk and remove the illusion of invulnerability in order to bridge the gap between knowledge and behavioral change.

The documented gender differentials in risk perception also highlight the importance of addressing women's status in health promotion. Although

young women are less likely to engage in risky sexual practices than young men, their perceived risk of contracting AIDS is greater than men's, because of their partners' behavior. Therefore, an important barrier to behavioral change lies in culturally based gender power imbalances, which are compounded by partners' age disparities and relations of economic dependency. Perceived risk is not likely to translate into HIV prevention if cultural and gender norms prevent women from negotiating fidelity or condom use with their partners.

Although most respondents reported that the threat of AIDS had compelled them to modify their behavior, when behavioral change was defined more narrowly as the initiation of condom use, this was found to be limited, particularly among women. Young women relied primarily on monogamy as a prevention strategy – although its effectiveness is questionable, given the large proportion of female respondents who doubt their partner's faithfulness – and only rarely initiated condom use, even when they perceived that they were highly susceptible to infection. The analysis also showed that knowledge about condoms as effective protective means was associated with increased condom use, but that this knowledge was far from universal.

Several limitations of this study should be noted. First, self-reported sexual behavior may be subject to reporting errors. Respondents, particularly adolescent girls, are likely to feel pressure to conform to socially acceptable behavior (Mensch *et al*., 2003). Second, the cross-sectional design of the data does not allow us to fully ascertain the direction of causality between risk perception and sexual behavior: high risk perception may lead to subsequent behavioral change but, conversely, a minor change in behavior may alter the perception of personal risk without dramatically changing actual risk. Furthermore, the perception of risk is not static but varies with context, type of partner and over time (Akwara *et al*., 2003). Longitudinal data would be needed to establish causal links and dynamic interactions (Smith and Watkins, 2005), but they are rarely available. Despite the limitations of cross-sectional data, we found evidence of a positive association between self-assessed risk and initiation of condom use among men.

A decade ago, AIDS prevention campaigns focused their efforts on providing information in the hope that knowledge would lead to behavioral modification. This study confirms prior research suggesting that enhancing youth knowledge about AIDS is important and necessary, but is not sufficient to bring about a broad change in sexual patterns that entail health risks. Emphasis in prevention campaigns has recently shifted from raising awareness about AIDS to behavioral change promotion. We have pointed

out in this study some of the obstacles to behavioral change that need to be addressed, such as the gender gap in knowledge about AIDS, the distorted perception of personal susceptibility to infection and the difficulties experienced by women in implementing prevention strategies when their personal risk is linked to their partner's behavior. Hence, effective prevention interventions should work towards sensitizing youth to personal risk so they can make informed choices, improving couple's communication on sexual matters, empowering women to negotiate safe sexual behavior, reducing the social acceptance of high risk sexual practices, and promoting the acceptability and access to condoms among both married and unmarried youth. In other words, educating, motivating, persuading and enabling should be the cornerstones of AIDS campaigns. Until there is an effective and affordable vaccine, risk reduction through changes in sexual behavior and consistent condom use remain the only means of cutting the chain of transmission of HIV infection in high HIV prevalence areas.

Although many studies are pessimistic about the prospects of change in sexual practices (Caldwell, 2000), the norms and patterns of sexual behavior might change as fertility did in the recent past. The process of behavioral change is both complex and extended in time. Kenya was the first country in sub-Saharan Africa to adopt a national population policy (1967) and modern methods of contraception have been available in the country since the early 1960s. During the 1970s, fertility showed no sign of declining, and this stagnation was attributed to cultural barriers to change. A decade later, however, Kenya started one of the most dramatic fertility declines in the world: from 8.1 children per woman in 1978 to 4 children at present (United Nations, 2003a). There was, hence, a significant time lag before translating contraceptive knowledge into practice. A similar process may be happening with regard to AIDS. Even though HIV prevalence in the country is high, a large proportion of Kenyans still consider themselves at little or no risk of infection. As AIDS-related mortality increases and the devastating consequences of AIDS become more visible in the local community, AIDS might shift from an abstract to an immediate threat, and communities or social groups are likely to introduce new norms and values that enhance the processes of sexual behavioral change (Bowser, 2002; Lugalla *et al*., 2004). School and community-based programs that improve personal risk assessment and enhance prevention skills among youth would reinforce this process of social change. The declining incidence of HIV infection in Uganda (Kilian, 1999; Low-Beer and Stoneburner, 2003; Singh *et al*., 2003), where both the epidemic and the response started earlier than Kenya, is an encouraging example.

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Table 2 – *Distribution of all women and men aged 15-24 according to sexual, marital and contraceptive experience, in successive surveys 1977-1998*

		Women				Men	
		1977 KFS[a]	1989 KDHS	1993 KDHS	1998 KDHS	1993 KDHS[b]	1998 KDHS
Percentage ever sexually active							
Age	15-19	-	44	46	44	-	54
	20-24	-	86	89	89	95	91
Percentage ever married							
Age	15-19	27	20	16	17	-	1
	20-24	73	68	60	65	22	23
Percentage of never married with sexual experience							
Age	15-19	-	32	36	32	-	54
	20-24	-	73	71	68	93	88
Percentage currently using modern contraception							
Age	15-19	0	2	2	4	-	18
	20-24	3	12	16	20	27	35

Notes: [a] The 1977/78 KFS did not gather data on sexual activity, and collected contraceptive data only among currently married non-pregnant women.

[b] The 1993 KDHS interviewed men aged 20 to 54.

Table 4 – *Odds ratios from logistic regression analysis on several types of risk sexual behaviors*

	First sex < age 15	Multiple partners	Casual sex	Money/gift for sex	Never used condom
			Women		
Age					
(15-19)	1.00	1.00	1.00	1.00	1.00
20-24	0.49 ***	1.12	1.32	1.02	1.03
Marital status					
(Never/formerly in union)	1.00	1.00	1.00	1.00	1.00
In union	0.87	0.08 ***	0.01 ***	0.19 ***	1.62 ***
No. of children					
(0)	1.00	1.00	1.00	1.00	1.00
1+	1.33 **	1.05	0.69 **	0.83	1.10
Educational level					
None	1.43	1.28	0.89	0.56	2.38 **
(Primary incomplete)	1.00	1.00	1.00	1.00	1.00
Primary complete	0.60 ***	0.58 **	0.93	0.95	0.86
Secondary+	0.36 ***	0.33 ***	0.56 ***	0.78	0.55 ***
Enrolment status					
(Out of school)	1.00	1.00	1.00	1.00	1.00
In school	1.30	0.23 ***	1.90 ***	0.70	1.28
Residence					
(Rural)	1.00	1.00	1.00	1.00	1.00
Urban	0.91	1.27	1.03	2.53 ***	0.54 ***

Table 4 – cont'd

	First sex < age 15	Multiple partners	Casual sex	Money/gift for sex	Never used condom
Religion					
(Catholic)	1.00	1.00	1.00	1.00	1.00
Protestant	1.08	1.03	1.49 **	0.91	0.95
Muslim/Other	0.96	1.81 *	0.93	1.09	1.02
Timing of 1st sex					
< age 15	-	2.32 ***	1.31	1.54 **	0.80 *
(> age 15)	1.00	1.00	1.00	1.00	1.00
Knows healthy-looking person can have AIDS					
(No)	1.00	1.00	1.00	1.00	1.00
Yes	0.99	1.03	0.75	0.71 *	1.02
Knows a person can get AIDS from sex					
(No)	1.00	1.00	1.00	1.00	1.00
Yes	1.10	1.85 ***	0.99	0.99	0.71 ***
Knows condoms can prevent AIDS					
(No)	1.00	1.00	1.00	1.00	1.00
Yes	0.98	1.21	0.87	0.94	0.41 ***

Table 4 – cont'd

	First sex < age 15	Multiple partners	Casual sex	Money/gift for sex	Never used condom
			Men		
Age					
(15-19)	1.00	1.00	1.00	1.00	1.00
20-24	0.53 ***	1.25	0.67 ***	1.49 **	0.81
Marital status					
(Never/formerly in union)	1.00	1.00	1.00	1.00	1.00
In union	0.95	0.21 ***	0.07 ***	0.58	3.17 ***
No. of children					
(0)	1.00	1.00	1.00	1.00	1.00
1+	1.74 **	2.07 **	0.94	1.25	0.54 **
Educational level					
None	1.46	2.38	1.10	1.97	1.27
(Primary incomplete)	1.00	1.00	1.00	1.00	1.00
Primary complete	0.58 ***	1.25	0.80	0.76	0.71 **
Secondary+	0.63 ***	0.66 **	0.79	0.54 ***	0.51 ***
Enrolment status					
(Out of school)	1.00	1.00	1.00	1.00	1.00
In school	1.41 **	0.77	1.21	0.77	1.84 ***
Residence					
(Rural)	1.00	1.00	1.00	1.00	1.00
Urban	0.88	0.79	0.98	1.35	1.13

Table 4 – cont'd

	First sex < age 15	Multiple partners	Casual sex	Money/gift for sex	Never used condom
Religion					
(Catholic)	1.00	1.00	1.00	1.00	1.00
Protestant	1.24	1.27	0.98	1.14	0.95
Muslim/Other	0.84	1.40	1.11	1.11	0.92
Timing of 1st sex					
< age 15	-	1.77 ***	0.99	2.01 ***	0.89
(> age 15)	1.00	1.00	1.00	1.00	1.00
Knows healthy-looking person can have AIDS					
(No)	1.00	1.00	1.00	1.00	1.00
Yes	0.53 ***	1.25	0.63 **	1.91 **	0.71 *
Knows a person can get AIDS from sex					
(No)	1.00	1.00	1.00	1.00	1.00
Yes	0.92	1.20	1.07	0.61 **	1.17
Knows condoms can prevent AIDS					
(No)	1.00	1.00	1.00	1.00	1.00
Yes	1.20	1.49 ***	0.87	1.97 ***	0.32 ***

Notes: * p<0.10, ** p<0.05, *** p<0.001.
Reference categories are in parentheses.

Table 6 – *Odds ratios from logistic regression analysis on high*[a] *perceived risk of getting AIDS*

	Women	Men
Socio-demographic characteristics		
Age		
(15-19)	1.00	1.00
20-24	1.16	1.16
Marital status		
(Never/formerly in union)	1.00	1.00
In union	1.07	1.28
No. of children		
(0)	1.00	1.00
1+	1.21	1.27
Educational level		
None	0.98	0.79
(Primary incomplete)	1.00	1.00
Primary complete	0.82	0.84
Secondary+	1.08	0.99
Enrolment status		
(Out of school)	1.00	1.00
In school	1.01	0.99
Residence		
(Rural)	1.00	1.00
Urban	0.91	0.73
Religion		
(Catholic)	1.00	1.00
Protestant	1.05	0.63 ***
Muslim/Other	0.76	0.53 ***

Table 6 – cont'd

	Women	Men
Exposure to risk		
Age at 1st sex (ref.: >15)	1.05	1.01
More than 1 sexual partner (ref.: Only 1 sexual partner)	1.64 ***	1.93 ***
Last sexual partner casual (ref.: Last sexual partner stable)	1.06	1.28 *
Received/gave money for sex (ref.: Did not exchange money)	1.43 **	1.38 *
Had a *STI* (ref.: Had no *STI*)	2.50 ***	2.04 **
Never used a condom (ref.: Ever used a condom)	0.94	0.87
Knowledge		
Knows a healthy-looking person can have AIDS (ref.: Does not know)	1.41 ***	1.19
Knows a person can get AIDS from sex (ref.: Does not know)	1.01	1.68 **
Knows condoms can prevent AIDS (ref.: Does not know)	1.23 **	0.77
Knows a person with AIDS (ref.: Does not know)	1.16	1.33 *

Notes: [a] "High" perceived risk includes "great" and "moderate" perceived risk.
* p<0.10; ** p<0.05; *** p<0.001.
Reference categories are in parentheses.

Table 8 – *Odds ratios from logistic regression analysis on reporting condom as behavioral change in response to AIDS*

	Women	Men
Socio-demographic characteristics		
Age		
(15-19)	1.00	1.00
20-24	0.90	0.97
Marital status		
(Never/formerly in union)	1.00	1.00
In union	0.45 **	0.44 **
No. of children		
(0)	1.00	1.00
1+	0.75	1.84 **
Educational level		
None	0.35	1.62
(Primary incomplete)	1.00	1.00
Primary complete	0.87	1.50 **
Secondary+	1.94 **	1.82 ***
Enrolment status		
(Out of school)	1.00	1.00
In school	0.76	0.78
Residence		
(Rural)	1.00	1.00
Urban	2.34 ***	0.67 *
Religion		
(Catholic)	1.00	1.00
Protestant	1.10	1.16
Muslim/Other	1.38	0.90

Table 8 – cont'd

	Women	Men
Exposure to risk		
Age at 1st sex (ref.: >15)	2.62 ***	1.21
More than 1 sexual partner (ref.: Only 1 sexual partner)	2.42 ***	2.23 ***
Last sexual partner casual (ref.: Last sexual partner stable)	1.30	1.06
Received/gave money for sex (ref.: Did not exchange money)	1.31	1.38 *
Had a *STI* (ref.: Had no *STI*)	3.58 **	1.33
Knowledge		
Knows a healthy-looking person can have AIDS (ref.: Does not know)	1.54	1.74 **
Knows a person can get AIDS from sex (ref.: Does not know)	0.94	0.89
Knows condoms can prevent AIDS (ref.: Does not know)	3.87 ***	3.79 ***
Perceived severity		
Thinks AIDS is a fatal disease (ref.: AIDS can be cured)	0.72	1.55 **
Perceived prevalence		
Knows a person with AIDS (ref.: Does not know)	0.66	1.19
Perceived personal risk		
(None)	1.00	1.00
Low	1.52	1.61 ***
Moderate	1.62	1.55 **
High	0.78	1.67 *
Tested for HIV	1.38	1.40

Notes: * p<0.10; ** p<0.05; *** p<0.001. Reference categories are in parentheses.